اثلث للمقاولات

a3lo3

TOMORROW'S SOLUTION TODAY

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The Center for Excellence in Infrastructure

اثلث للمقاولات

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TOMORROW'S SOLUTION TODAY

COMPANY PROFILE

We are اثلث للمقاولات a3lo3

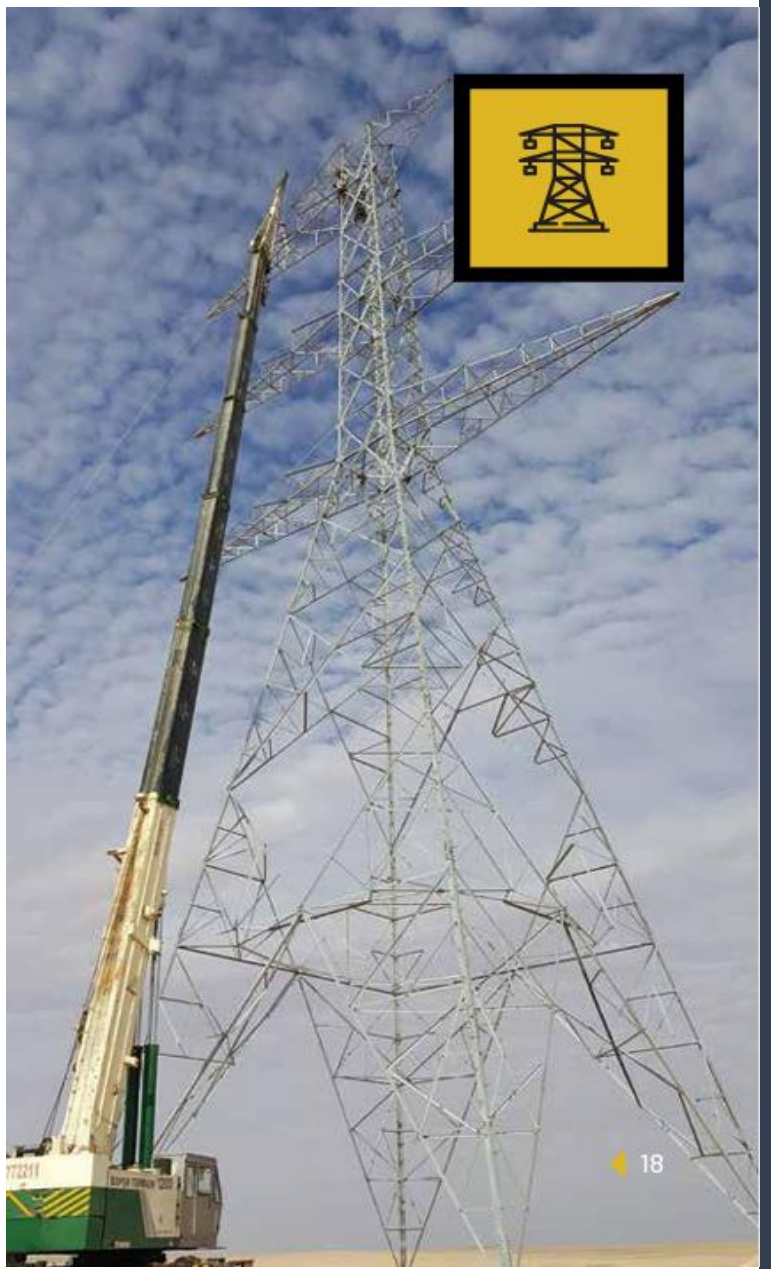
Experts in installing and testing power systems, ranging from generating station to transmission station at different voltage levels. Being one of the top of Saudi exporters of EPC services, we rely on the expertise and experience we've collected from our Saudi operations as a strong foundation.

THE CONTENT

About Company

a3lo3 company was established in 2019. Centrally situated in Hial, a3lo3 is a leading ISO certified, Aramco and Saudi Electricity Company (SEC) approved company for suppling and testing all high, medium and low voltage units. Establishing with in a very short period of time an enviable reputation as a dynamic innovative and specialized company with expert resources offering a comprehensive and professional service.

IN kingdom of Saudi Arabia a3lo3 has
carrying out large-scale infrastructure projects



About Company

اثلث للمقاولات
a3lo3

TOMORROW'S SOLUTION TODAY

Name of the company	Athulth for contracting
Nationality	Limited liability company
Commercial registration number	3350172648
SEC Vendor Number	2012213
NEOM Vendor Number	S11342017
Head office	Hail, Al Mahatta – Al Imam Al Shafie road – Kingdom of Saudi Arabia
Scope of contracting activities	Installing and testing power systems, ranging from generating station to transmission station at different voltage levels & Contracting & Steel Fabrication and Services

A3lo3
General Manager

Dr. Ahmed Alghadban

Dr. Ahmed Alghadban educational achievements. Earning bachelor in Electrical engineering from University of Toledo (USA). He also has a Master of Science from DePaul University (USA), and a PhD in electrical engineering from University of Kent (UK).

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At a3lo3 our General Manager is Dr. Ahmed Alghadban. Dr. Ahmed Alghadban holds with in his career portfolio a proven track record of esteemed managerial skills, He worked for Saudi Electricity Company (SEC), KSA He had a long and fruitful career at Saudi Basic Industries Corporation (SABIC) lasting many years, crossing Four continents –North America, Europe, Africa and Asia. Equally impressive.

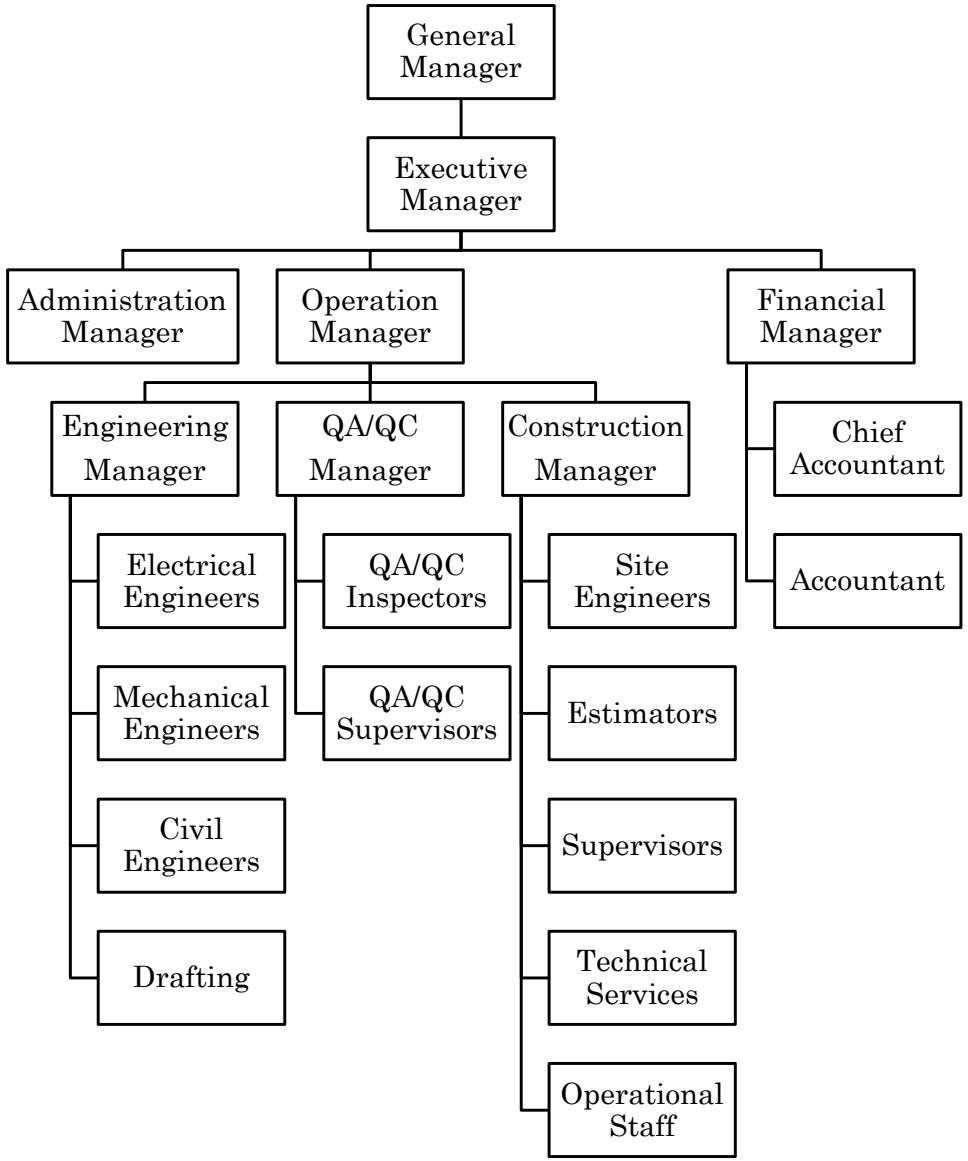
A3lo3
Executive Manager

Eng. Mahmoud Elnaggar

Eng. Mahmoud Elnaggar educational achievements. Earning bachelor in Electrical engineering from MANS, he also holds MSc in Interconnection in Electrical Power System.

At a3lo3 our Executive Manager is Eng. Mahmoud Elnaggar. Eng. Elnaggar holds with in his career portfolio a proven track record of esteemed managerial skills, Previously the Industrial performance manager of Caesar Farm Plants, EGY, his lengthy and successful career with Schneider spanned for decades, crossing three continents – Europe, Africa and Asia. Equally impressive.

Organization Chart



OUR TEAM

Beyond achieving customer satisfaction, we understand that one of our most important resources is our multi-skilled and quickly growing a3lo3 team, which consists of 15 engineers and 100 technicians. Their well-being is critical to a3lo3's successful operations. The core of A3lo3's beliefs and values are teamwork and mutual respect among employees, both horizontally and vertically. This allows us to provide our clients with effective services in all of their forms. To meet the needs of our clients, we continuously improve the expertise of the a3lo3 team.

QUALITY ISN'T AN ACT; IT IS A HABIT

Aristotle

Vision

via constant improvement in all construction activities, to become the premier organization in offering excellent construction solutions across all spectrums.

Mission

Our ability to provide prompt, dependable, and efficient solutions is something we take great pride in. Our ultimate goal is to always surpass customer expectations by applying our extensive knowledge. We understand that our future depends on your success

& VALU

Customer Focused

integrity

perseverance

Creativity

Responsibility

Leadership

Quality Control Program

A. COMPANY POLICY & SCOPE OF WORK

A.1 This Quality Control Plan has been established to ensure that all phases of construction, as well as inspection and testing activities, are carried out in accordance with the requirements of the Construction procedures, applicable codes, specifications, and drawings, and that the Contractor's work is generally carried out to a high standard of workmanship.

A.2 The Quality Control Manager is in charge of plan implementation and will report directly to the Project Manager.

A.3 The Quality Control Manager has the authority to discover problems, initiate corrective action, recommend remedies, and stop work as ordered by the Construction Manager.

B. QUALIFICATIONS OF QUALITY CONTROL PERSONNEL

B.1 This section covers the Quality Control Organization that will carry out the Quality Control Plan.

B.2 **The Project Manager:**

B.2.1 A3lo3's Management will receive direct reports from the Project Manager.

B.2.2 He will be in charge of ensuring that all construction, inspection, and testing operations on the job site adhere to the authorized Quality Control Plan.

B.2.3 He will represent the Contractor in all contractual concerns and communicate with the Construction Manager.

Quality Control Program

A. COMPANY POLICY & SCOPE OF WORK

A.1 Identify all actions and procedures that will be utilized to complete the work for 380/132kV OHTL Installation customized for NG-SA.

A.2 This Quality Control Plan has been established to ensure that all phases of construction, as well as inspection and testing activities, are carried out in accordance with the requirements of the Construction procedures, applicable codes, specifications, and drawings, and that the Contractor's work is generally carried out to a high standard of workmanship.

A.3 The Quality Control Manager is in charge of plan implementation and will report directly to the Project Manager.

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Quality Control Program

B.2.4 He is responsible, through his organization, for managing construction activity and ensuring the availability of necessary tools, equipment, manpower, and supervision.
B.2.5 He will be in charge of purchasing, receiving, and storing all materials.
B.2.6 He will keep the site clean and safe.

B.3 Quality Control Manager:

B.3.1 The Quality Control Manager will report directly to the Project Manager.
B.3.2 He shall be responsible for the implementation of the approved quality control Plan and ensure compliance with the Contract Specifications and Drawings.
B.3.3 He is responsible for maintaining an adequate qualified Quantity Control Staff to complete all responsibilities outlined in the approved Quality Control Plan and contract specifications.
B.3.4 He will be in charge of assessing all construction designs to ensure that they meet all quality requirements before they are released for construction.In addition, He must study and approve any as-built drawings prior to final acceptance, as well as any amendments to the contract specifications before usage.
B.3.5 He will be in charge of developing all Quality Control, Inspection, and Testing Procedures required for the successful implementation of the approved Quality Control Plan and compliance with contract specifications.
B.3.6 He will appoint and direct the Quality Control Inspectors to carry out the specific responsibilities outlined in this Quality Control Plan.

Quality Control Program

B.3.7 He shall verify all purchase requisitions prior to issuing them to ensure that the appropriate QA/QC requirements are met.
B.3.8 He will oversee the vendor's Quality Control efforts to guarantee that all materials, goods, and services delivered by the vendor meet the criteria of the contract specifications.
B.3.9 He must establish and manage a filing system for all Quality Control methods, documents, and reports.
B.3.10 He must ensure that all samples, certifications of laboratory and field tests, and inspection reports meet the contract criteria.
B.3.11 He will direct the testing laboratory's completion of relevant tests and verify all test findings for completeness and accuracy.
B.3.12 He will consult with the Construction Manager on all quality control issues.
B.3.13 He will be in charge of receiving and inspecting all goods and equipment that will be put in the project, as well as ensuring that all storage and protection standards are met.

B.4 Quality Control Inspectors:

B.4.1 The Quality Control Inspectors will report directly to the Quality Control Manager.
B.4.2 The Quality Control Inspector shall carry out the inspection and testing activities directed by the Quality Control Plan/Procedures and/or the Quality Control Manager, and shall record the results of inspection and testing on inspection checklists and transmit them to the Quality Control Manager for inclusion in the Quality Control Report.

Quality Control Program

B.4.3 The Quality Control Inspector shall carry out the authorized Quality Control Plan as directed by the Quality Control Manager.

B.5 Qualification Standards for Quality Control Personnel

shall be as follows.

B.5.1 The Qualify Control Manager must be a college graduate with a Bachelor of Electrical Engineering or Architecture and at least five years of relevant experience.

B.5.2 Quality Control Inspectors must have a minimum of three years of relevant building experience.

All Contractor personnel (engineering, procurement, and quality control) must be fully conversant with the requirements of the Contractor's Quality Control Plan.

C. QUALITY CONTROL PLAN & PROCEDURE

C.1 The Quality Control Manager is responsible for alerting the Construction Manager in writing of any proposed changes to the Quality Control Plan and obtaining approval to implement them.

C.1.2 The Quality Control Manager is responsible for distributing the approved Quality Control Plan to field supervisors. Revisions to the Quality Control Plan must be controlled in the same way as the initial plan, with the same evaluation and approval.

Quality Control Program

C.1.3 If the Construction Manager finds during the length of the contract that the Quality Control Plan does not effectively cover all inspection and testing needs, the Quality Control Manager must amend the plan in consultation with the Construction Manager.

C.1.4 The Quality Control Manager is in charge of preparing, gaining approval for, and issuing the Quality Control Plan, as well as the requisite inspection and testing methods. The Contractor's Management will examine and accept the Quality Control Plan submitted by the Quality Control Manager.

C.1.5 The Quality Control Plan will be presented to the Construction Manager for approval. The Quality Control Manager is responsible for amending the Quality Control Plan to the satisfaction of the Construction Manager.

C.2 Inspections and Testing Plan:

C.2.1 The Quality Control Manager is responsible for developing and implementing the appropriate inspection and testing plan in accordance with the Quality Control Plan, Contract Specifications, applicable Codes, Standards, and Drawings.

C.2.2 The Inspection and Test Plan must specify the kind of samples to be collected, the frequency of testing (indicated on a schedule or checklist rather than a generic approach), and the sampling criteria.

Quality Control Program

C.2.3 The inspection and test plan must include a detailed description of each item or portion of construction work to be inspected or tested, acceptance criteria, the use of inspection checklists for recording inspection and test data, the sequence of testing, and the responsibilities of the Quality Control Inspectors and/or testing agency.

C.3 Construction Procedures:

C.3.1 The Project Manager is responsible for developing and, when needed, qualifying Construction Procedures for processes specified in the Contract.

C.3.2 The Construction Procedure shall include a reference to the applicable contract specification, job location, and a detailed description of the applicable construction process. The protocol must also include the construction sequence, the proper usage and identification of materials and equipment, craftsmanship requirements, and functional performance parameters, if needed.

C.3.3 The Construction Procedure must be presented to the Construction Manager for approval. All changes requested by the Construction Manager must be integrated into the relevant processes and resubmitted for the Construction Manager's final approval.

C.3.4 All authorized procedures must be delivered to the responsible supervisors in the field. All updates to the procedures must be approved and controlled in the same way as the original procedure.

Quality Control Program

C.4.4 The Quality Control Manager and Material Controller will create a list of "Approved vendors" based on part performance and/or source inspection at the vendor's plant. The Quality Control Manager is responsible for ensuring that the vendor's activities for manufacturing materials and items or providing services are carried out in accordance with the specifications, which must be approved by the Construction Manager.

C.4.5 When materials or items arrive, the Materials Supervisor and the Quality Control Manager must evaluate the package for purchase and transportation damage standards.

C.4.6 The Material Controller is responsible for establishing shortage needs for all materials and items and ensuring that they are properly stored until ready for construction.

C.4.7 The Quality Control Manager will be in charge of conducting surveillance inspections on materials and goods in storage.

D. MATERIAL CONTROL

D.1 The Material Controller is responsible for developing and implementing a material control program that describes controls for the procurement, receipt, and storage of materials, equipment, sub-assemblies, components, parts, tools, instruments, and other items (hereinafter referred to as "materials & items") and services.

Quality Control Program

D.2 The appropriate supervisor shall initiate the purchase requisition. The requisition must include, but not be limited to, the following information.
D.2.1 Material/item description, specification, standard, type, grade, and so on.
D.2.2 Quantity.
D.2.3 Identification and marking requirements
D.2.4 Test and inspection requirements, as well as any applicable documentation.
D.2.5 Reference to Drawings and/or Specifications
D.2.6 Packing/Shipping instructions and location.
D.3 The Quality Control Manager is responsible for examining the Purchase Requisition and ensuring that all relevant quality-related requirements are included in the requisition, as well as validating the selection of "Approved Vendor" on the Final Purchasing Document.

E. CONSTRUCTION PROCESS INSPECTION & TEST CONTROL

E.1 The Project Manager is in charge of implementing a construction process control program that specifies the construction requirements and sequence of operations. The Quality Control Manager is responsible for developing an inspection and testing program that offers verification and assurance through quality control that the construction meets the criteria of the contract specifications.

Quality Control Program

E.2 The Construction Procedures, Inspection, and Test Plan will be utilized to determine the construction sequence and inspection requirements for the inspection checklist. The Quality Control Manager is responsible for checking the inspection checklist to ensure that all inspection requirements are included. All tests and inspections must be reported in writing to the Construction Manager prior to the start of construction activities.

E.3 Throughout the construction process, all inspections must be performed by qualified Quality Control Inspectors. The inspection results must be reported on the inspection checklist.

E.4 Test Control:

E.4.1 Test reports must include the test technique, test results, computations, and acceptance criteria. Items tested, equipment utilized, and ambient conditions, if applicable.

E.4.2 Tests must be conducted in accordance with stated guidelines. The Construction Manager or their Appointed Representative must be notified in writing prior to the start of any Tests.

E.5 All completed inspection checklists and test reports must be reviewed and accepted by the Quality Control Manager to ensure that all materials and items used in the work have been properly inspected and tested and meet the necessary contractual technical requirements.

Quality Control Program

F. CALIBRATION CONTROL

F.1 The Quality Control Manager is in charge of implementing a program to control the calibration, recall, repair, and maintenance of measuring devices, thermometers, and instruments, together referred to as Quality Control inspection and testing equipment.

F.2 The Quality Control Manager must keep an Instrument Log of every equipment. The log must include a description, identification number, calibration date, frequency, calibration due date, method of calibration, calibration record, and equipment status.

F.3 All test and inspection devices must be clearly marked or tagged with the instrument number and calibration required date. Calibration must be traceable to the National Bureau of Standards or another certified internationally recognized standard.

F.4 Measuring equipment must be calibrated in compliance with the requirements outlined on the instrument log sheet and subject to controlled issue under the supervision of the Quality Control Manager. Prior to issuing for a specific test, the instrument must be verified to ensure its proper condition. When the instrument is returned, it will be inspected to ensure that it is not damaged.

Quality Control Program

G. NON-CONFORMITY AND CORRECTIVE ACTION

G.1 When conditions exist that are detrimental to quality, other than material conformity, the Quality Control Manager will initiate a non-conformance report.

G.2 The Project Manager must recommend a resolution to the nonconformity and get the Construction Manager's concurrence and approvals.

G.3 The Quality oversee Manager is in charge of implementing a program to oversee the identification, documentation, and, where possible, segregation of materials, things, or circumstances that do not meet the requirements of the design specifications, drawings, and standards.

G.4 If a non-conformity is indicated or known to exist, the materials or products that do not conform must be separated, and the Quality Control Manager is responsible for starting a non-conformance report.

G.5 The Quality Control Manager is responsible for ensuring that the necessary approved disposition is carried out by the Construction Supervisor.

G.6 The Quality Control Manager will examine all non-conformance reports once a month and ensure that necessary remedial action is initiated and implemented to avoid the non-conformity from occurring again. He must provide a summary of all nonconformances and corrective measures and submit it to the Project Superintendent and Construction Manager.

Quality Control Program

H. VENDOR CONTROL

H.1 The Quality Control Manager will establish vendor surveillance actions on the Purchase Requisition. These actions may include, but are not limited to, establishing hold and witness points in the production process, performing first item inspection, and releasing for shipment inspection. If surveillance reveals poor conditions, materials or items will be stopped at the vendor's plant until an assessment of corrective action and results is completed.

H.2 The Quality Control Manager will launch a Vendor Audit Program. The audit team shall be composed of specialists as appropriate and approved by the Quality Control Manager. The survey will include an assessment of the vendor's quality control system at their facilities. In addition to the aforesaid review, Vendor acceptance may be based on historical performance evaluation. The Quality Control Manager must keep an approved vendor list.

H.3 The Quality Control Manager is in charge of authorizing manufacturers, fabricators, material manufacturers, material suppliers, and suppliers for subcontracted services (hence referred to as VENDOR).

Quality Control Program

I. RECORD AND DOCUMENT CONTROL

I.1 Records should be stored properly to prevent deterioration.

I.2 The Quality supervise Manager will be in charge of developing and implementing a program to supervise the collection, storage, and maintenance of quality control data created throughout construction.

I.3 Prior to the Construction Manager accepting a specific site, the contract requirements for transferring records to the Construction Manager for final storage must be set and followed. When records are not transferred to the Construction Manager, the Contractor must keep them for the duration of the warranty period stipulated in the Contract.

I.4 The Quality Control Manager will monitor to ensure that the document control procedure is followed in the field.

QUALITY PROCESS

With a focus on customer satisfaction from the outset and a strict quality control system that is implemented, maintained, and improved at every stage, we can confidently and clearly demonstrate our willingness to meet and surpass the high standards and expectations of our stakeholders and customers while adhering to regulations. As a result, we are happy to announce that the A3LO3 Foundation complies with international standards, as certified to by the ISO certificates.

WORK METHODOLOGY

I. TOWER FOUNDATION WORKS

I.1 SURVEYING WORKS:

I.1.1 AMC and ABC will conduct a joint survey on the center point of all tower locations, utilizing specified Aramco benchmarks as a guide and authorized drawings. Stakes and flags will be installed for easier identification. The center of the tower must be provided/surrounded with concrete mortar with the Tower number printed on it.

I.1.2 The ABC surveyor will continue the survey by marking the margins and corners of the tower structure pads, as well as the edges of access roads. The construction team (civil) will utilize these markings as a reference while carrying out the task.

I.2 ACCESS ROAD AND STRUCTURE PAD CONSTRUCTION:

I.2.1 Using the surveyor's marks, the civil crew will transport base course backfilling materials along the whole route of the access roads, as well as all tower structure pads.

I.2.2 The base course materials will be spread inside the surveyor's markings using heavy earth moving equipment (a loader and grader). The surveyor must periodically examine the elevations of the access road and structure pads to ensure that they are within the acceptable level as shown on the approved plans.

I.2.3 The spread base course will then be irrigated to prepare for backfilling. Once the water has been absorbed by the base course, a vibration roller will operate on the compaction until the necessary hardness is achieved.

WORK METHODOLOGY

I.2.4 The top level of the access road and structure pads must be sloping (1.5 to 2%) from the center to the shoulder/edges and should be examined by a surveyor.

I.3 STRUCTURE STAKING:

I.3.1 Before excavating the tower foundation, the surveyor must mark the centers of the pier foundation for use as a reference during the excavation.

I.3.2 The pier's central location shall be designated with cut rebar secured with warning tape.

I.3.3 Angle towers must be properly staked in accordance with the ARAMCO/SEC Standard Staking Procedure and approved drawings.

I.4 STEEL REINFORCEMENT ASSEMBLY AND INSTALLATION:

I.4.1 The rebar cage shall be prepared using the prescribed sizes and numbers of reinforcing bars as per authorized designs, either on the tower location site or in the workshop (after being shipped assembled to site).

I.4.2 The rebar cage will be placed at the tower's site, so that it can be reached by crane during setting/installation. The rebar cage must not interfere with the crane's position.

I.5 AUGERING FOR PILE FOUNDATION INCLUDING CASING (FIRST STAGE CONCRETING):

I.5.1 Using augering machinery aligned to the marked center point of the pile, a hole is excavated until the requisite depth is reached

WORK METHODOLOGY

I.5.2 Casing is subsequently inserted through the caving soil (sandy), and drilling continues to the desired depth. All leftover materials inside the case will be removed.
I.5.3 The rebar cage is to be installed in the casing. Plastic spacers will be utilized on the rebar cage to maintain distance.
I.5.4 Concreting with a funnel and hose. As the concrete level rises, the casing is gradually pulled from the hole.
I.5.5 Because this is a two-stage concreting project, the final level of concrete must be as specified in the approved drawing, leaving enough space for stub installation and the second step of concrete.

I.6 STUB SETTING:

I.6.1 Assembly of stubs near tower legs. All hooks will be fitted, fastened, and tightened to their final tension. During assembly, the stubs will be supported by wooden battens.
I.6.2 Assembly of a suitable setting template for the type of tower to be built. All connections and joints must be carefully tightened.
I.6.3 The four panels of the constructed setting plate will be lifted and placed on mechanical jacks. The setting templates' ends will be mechanically attached to the other panels, resulting in a hard square configuration.
I.6.4 The stubs will be raised one by one and positioned inside the foundation's rebar cage and at the corner of the setup template. The stubs will be fastened to the setting template. After bolting, the stubs should be hanging with their cleats within the rebar cage.

WORK METHODOLOGY

I.6.5 Using a dumpy level, the elevation of the top of the stubs must be the same. Mechanical jacks allow for adjustments. This technique must be followed precisely because it will be crucial in the constructing of the tower. Following installation, the jacks and other supports utilized must be fastened to prevent movement.

I.6.6 The back-to-back dimensions of the stubs must be measured on all four sides and two diagonals. The measurements must be +/- 2mm of the authorized drawings. Adjustments must be performed using chain blocks connected to the diagonals of the setting template. To ensure that the setup is square, the diagonal measurements must be as equal as feasible.

I.6.7 Install rebar earthing to the stubs and link the stubs to the tower's external earthing.

I.7 REINFORCEMENT GROUNDING INSTALLATION:

I.7.1 Reinforcement can be constructed at the site workshop using a 1 meter long 7#5AWG Copper Clad Steel Cable with crimped-type termination lug on one end and exothermic welded 16mm dia. (150mm long) reinforcing bar on the other end. This method could potentially be prepared on-site.

I.7.2 The terminal lugs will be secured to the tower stubs on all four tower legs. The other end of the cable, the reinforcing bar, will be welded to the foundation's vertical rebar.

I.7.3 An 8-meter-long 7#5AWG copper-clad steel cable (with crimped type terminal lug) must also be constructed and put on two diagonally opposed tower legs. The cable will travel through the concrete form of the foundation and coil slightly outside of it. This will be the major grounding connection between the tower and the grounding rods.

WORK METHODOLOGY

II. REINFORCEMENT GROUNDING INSTALLATION

II.1 Installation of shuttering/forms for the upper half of the rebar cage and the lower part of the stubs.
II.2 Before, during, and after concrete pouring, check the back-to-back dimension and level of stubs with a dumpy level.
II.3 Pour concrete to the final level specified in the approved designs.
II.4 After 24 hours, the shuttering will be erased, along with the stub settings.
II.5 During the curing phase, the concrete must be coated with wet absorbent material. The concrete must be watered once every day, but more frequently during warmer weather.

II.6 TOWER GROUNDING INSTALLATION:

II.6.1 Excavation should begin at the tower leg base and extend up to 8 meters in length. The excavation must be done in line with the approved designs, including depth and width. The grounding rod will be placed at the 8-meter point.
II.6.2 The provided grounding cable should be uncoiled and spread out at the bottom of the trench.
II.6.3 Ground rods should be positioned 8 meters distant from the tower legs. Ground rod length must be in accordance with authorized design drawings.
II.6.4 The cable is exothermically welded to the grounding rod using the proper endothermic mould and powder amount.
II.6.5 Coating the exothermic weld with waterproofing film (Denso film).

WORK METHODOLOGY

II.6.6 Backfilling the grounding cable.
II.6.7 Backfilling was compacted.

II.7 TOWER CONSTRUCTION/ ERECTION:

II.7.1 TOWER PARTS SEGREGATION AT THE STOCKYARD – BY TOWER:

II.7.1.1 Piece Marks normally delivers the tower pieces to the site, arranges them, and bundles them. Using the approved fabrication and erection drawings of the Towers, which include all Piece Marks, the tower pieces are carefully separated according to type.

II.7.1.2 The separated tower components must be put on wooden blocks to prevent the surface covering from harm. The stacking arrangement must be from the greatest tower part to the smallest. The total weight of the separated and re-bundled tower pieces must not exceed the SWL of the available lifting equipment.

II.7.1.3 Delivery to the tower location will be as specified by the tower number. Bolts and nuts will be delivered in quantity in carefully prepared cases. The tower sections will be transported using a self-loading/boom truck (SWL 10T). To lift the segregated tower sections, use sling pads with an adequate lifting capacity to avoid damaging the tower members' surface coating.

II.7.2 SEGREGATED TOWER PARTS DELIVERY TO TOWER LOCATION:

II.7.2.1 Before the tower parts arrive at the tower location, wooden battens will be put on the tower structure pads to support the members throughout unloading.

WORK METHODOLOGY

II.7.2.2 The tower parts must be positioned so that they do not interfere with the assembly work site and are close to the tower section that will be assembled.
II.7.2.3 To avoid damaging protective coatings, tower sections must be gently unloaded onto the accompanying wooden battens.

II.7.3 ASSEMBLY OF TOWER PARTS AT THE TOWER LOCATION:

Typically, tower parts are built on the ground in panels or sections. The size of the panels or sections shall be determined by the crane's lifting capabilities. The tower components are assembled as follows:
II.7.3.1 Leg extensions are installed in front of the tower foundations.
II.7.3.2 The basic body will be built in two panels.
II.7.3.3 Cage parts must be fully assembled.
II.7.3.4 Cross arms are built separately (top, middle, and bottom).
II.7.3.5 Tower summit will be fully assembled.
II.7.3.6 The bolts and nuts shall be partially tightened to allow for adjustments throughout the tower's building. One fastener must include the bolt, flat washer, nut, and palnut. Step bolts are an example of a special case that requires two sets of nuts and washers. Step bolts can be tightened up to the final tension without affecting the erection process. Tightening up to the required torque must be completed prior to the actual stringing work.

WORK METHODOLOGY

II.7.4 ERECTION OF TOWER PARTS:

Because the construction site is often flat, towers can be erected utilizing a mobile telescopic crane. The crane should be positioned along the OHL's axis, with each tower part accessible throughout the lifting procedure. The hoisting sequence is as follows:

II.7.4.1 Leg Extension - Four Parts

II.7.4.2 Basic Body Bottom Part - in two sections.

II.7.4.3 Basic Body Upper Part - in one piece.

II.7.4.4 Cage Part - One Part

II.7.4.5 Peak in one part.

II.7.4.6 Cross arms - individually starting from the bottom, then middle, and top.

While raising, each panel or section must be tied to keep it stable. Depending on the size and weight of the items to be lifted, the guiding ropes are either attached to a temporary anchor, such as steel bars, or held manually. The rope is released as needed, and temporary guys must be fastened to the top end of each segment to be installed until all primary cross elements are joined on the same level. These guys are typically fixed to machinery such as trucks.

II.7.5 TIGHTENING OF BOLTS – UP TO FINAL TORQUE:

II.7.5.1 The tightening crew will ensure that the appropriate bolt sizes are used in each hole given.

WORK METHODOLOGY

II.7.5.2 To tighten the nuts, use an appropriate spanner and/or socket wrench with handles. One crew will tighten to near-specs, while another will make the final inspection with a calibrated torque wrench. The most common fasteners are 16mm and 20mm in diameter, with final torque values of 100Nm and 165Nm. New specifications, however, will be stated in the drawings, thus this will be the value used.

II.7.5.3 Tighten all leg joints initially. The tightening will continue from top to bottom. Every fastener that is tightened must be promptly given with a palnut to signify that the fastener is already torqued, and no duplicate work will be performed.

II.7.5.4 Bolt positioning must be rigorously maintained. Fasteners put on vertical members must be orientated so that the bolt heads are inside the tower and the bolt body faces outward. Fasteners put on horizontal members will have the bolt heads at the bottom and the bolt body looking upwards.

II.7.6 TOWER ACCESSORIES INSTALLATION:

II.7.6.1 HARDWARES AND INSULATORS:

II.7.6.1.1 Hardware and insulator segregation in the stockyard

II.7.6.1.2 Approved designs will be utilized to determine the bill of quantities for each tower and tower type.

II.7.6.1.3 Each insulator string portion shall be separated from bulk supplies, organized, and correctly designated for which tower.

WORK METHODOLOGY

II.7.6.2 DELIVERY TO TOWER LOCATIONS:

II.7.6.2.1 The gathered materials will be delivered to the tower site by truck and may be installed manually or via boom truck.

II.7.6.2.2 The composite silicon insulators, being a delicate part, shall be sent with their original casing to prevent damage

II.7.6.2.3 Materials will be delivered to the site only during the installation schedule.

II.7.6.3 ASSEMBLY OF INSULATOR:

II.7.6.3.1 The delivered materials must be built on site according to the authorized plans (including manufacturer's drawings).

II.7.6.3.2 The assembled insulator string should not be set on the ground, but on plywood or plastic sheets.

II.7.6.4 HANGING OF INSULATOR STRINGS WITH INSTALLED ROLLERS/ TRAVELLER:

II.7.6.4.1 A hang line (rope) and pulley will be attached on the top cross arm of the tower for hoisting. Because the insulator string is lightweight, it can be hoisted manually by a group of three or four individuals. In circumstances where the insulation is heavier, a lifting tackle or crane may be used.

II.7.6.4.2 One or two lineman will position themselves on the cross arm, where the insulator strings will be put. The insulator string will be lifted until it is just below the cross arm connecting point.

II.7.6.4.3 The linemen will connect the insulator string's shackle to the cross arm connection point while ensuring that the cotter pin is properly inserted and secured.

WORK METHODOLOGY

II.7.6.4.4 The other cross arms will likewise be placed with insulator strings using the processes described above.

II.7.6.5 TOWER ID, DANGER SIGN AND PHASE IDENTIFICATION PLATES INSTALLATION:

II.7.6.5.1 The danger sign and phase identification plates share a single bracket and placement. These elements are typically fitted manually and are 3m above ground.

II.7.6.5.1 Two linemen will climb the tower using the provided step bolts and hand fasten the danger and phase ID plates to the given bracket. Bolts must be adequately tightened and furnished with palnuts.

II.7.6.5.1 Each tower has a tower ID that is affixed nearer to the tower leg using step bolts. The bolt holes are already drilled to match the holes on the tower ID plate holders. The ID must be consistent with the permitted circuit ID.

II.7.6.6 ANTI-CLIMBING DEVICE (ACD):

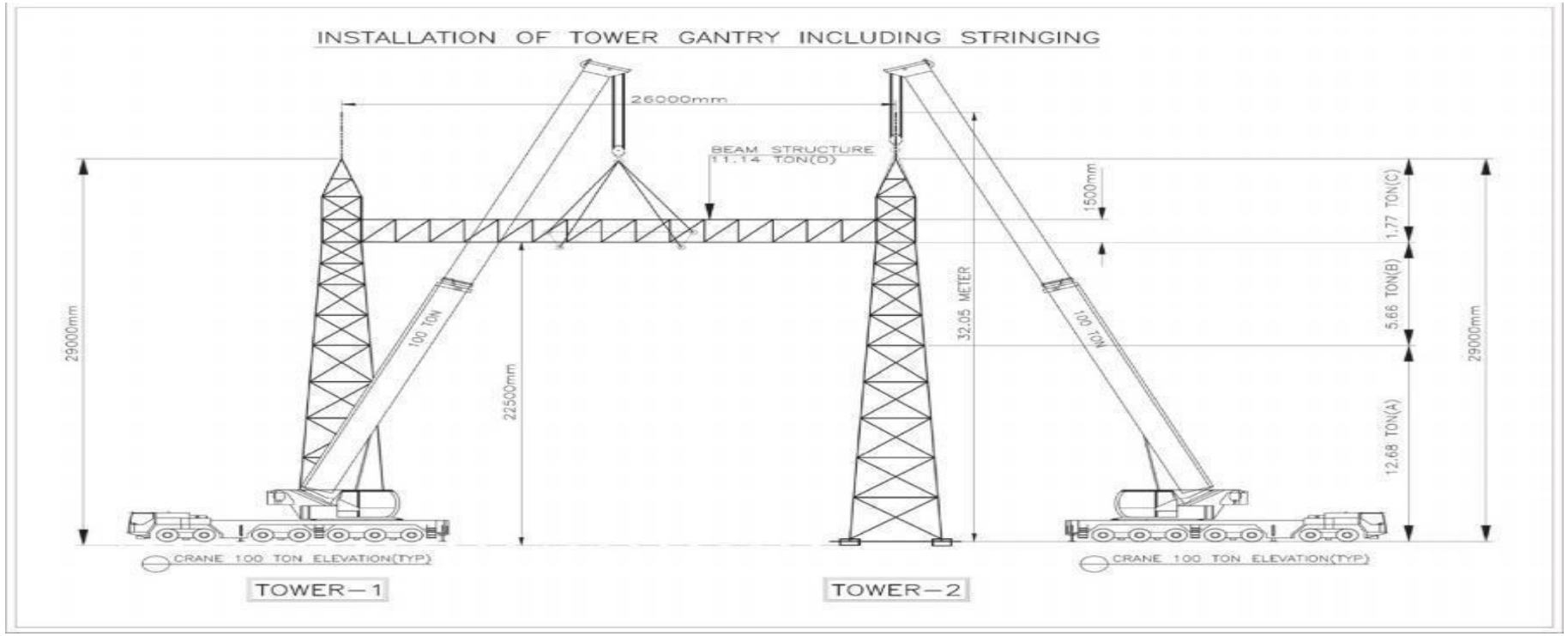
II.7.6.6.1 The ACD brackets will be put first, on all four legs of the tower.

These brackets are clamped to the main leg and do not require any extra drilling of the tower legs. The ACD stands approximately 3 meters above the ground (below the tower IDs).

II.7.6.6.2 Install the barbed wires on the brackets according to the authorized designs.

WORK METHODOLOGY

II.7.6.6.3 The other cross arms will likewise be placed with insulator strings using the processes ACD bracket on one tower leg must be placed with an ACD gate attached using stainless steel hinges. The client will give the locks later.



INSTALLATION OF TOWER GANTRY STRUCTURES (Sample Dimensions)

WORK METHODOLOGY

INSTALLATION OF TOWER GANTRY STRUCTURES (Sample Dimensions):

1. A suitable kind mounted telescopic crane shall be utilized to erect the panel. A crane with an appropriate capacity must be chosen based on the data sheets and the height-weight-radius chart.
2. The first section of the constructed panels shall be lifted using polyester web slings with the requisite lifting capability.
3. The assembled bottom portion of the tower shall be lifted using a crane and connected to the stubs with bolts, nuts, and washers of the right size as specified in the authorized designs.
4. Individual legs must be properly anchored until all bracing and diagonal members have been fitted and bolted.
5. Before beginning the construction of the following part, the lower section must be thoroughly braced, and all bolts and nuts must be provided adequately according to approved plans to avoid any mishaps during the erection.
6. The following component will be raised by crane and appropriately joined using a 450 mm long Tommy bar to fit the hole position and with the proper bolt and nut sizes. The process continues until the entire tower is constructed.
7. A temporary guy rope shall be tied to the tower part being lifted in order to govern the direction, proper placement, and movement of the sections being lifted using the guy ropes.

WORK METHODOLOGY

8. As a safety precaution, the second portion of the lifting must be installed on the ground, including the vertical lifeline.
9. Tower members shall be lifted only with polyester web slings, not steel slings.
10. Sections of tower panels should not be pulled to the ground or with other members as they rise. Each member must be checked to ensure that the galvanizing is not damaged and that there are no scratches or dust deposits on the tower members. Any dust deposits must be removed, and galvanizing damage must be repaired in accordance with the specifications.
11. The complete tower erection crew will be led by a professional supervisor/engineer.
12. During the building of the second half, installed vertical lifelines will be used for safety reasons while working at heights.
13. To complete the Tower's erection, follow steps 8 through 12 for stages 3 and 4 of the lifting operation.
14. During tower erection, a certified rigger/banker must be deployed to operate the crane.
15. The ground level for positioning the crane's outriggers must be stable.

WORK METHODOLOGY

II.8 ERECTION OF ASSEMBLED PANELS:

Following the completion of the tower assembly, as previously indicated, the lifting activities will proceed in the order listed below. Please see the attached sketch (attachment-1) for the lifting sequence.

Tower-1

First, the assembled part of tower-1A, as shown in the sketch (with a total weight of 12.68 tons - see attachment-2-BOQ), will be hoisted, positioned, and attached to the tower's stubs.

As a second phase, the completed part of tower -1B as shown in the sketch (middle component of the tower) (with a total weight of 5.66 tons - see attachment-2-BOQ) will be hoisted, positioned, and fastened to the top portion of the erected tower-1A. As a third step, the assembled section of tower -1C as per the sketch (Peak/top component of the tower) - (which has a total weight of 1.77 ton)

- Refer to attachment-2-BOQ), which will be hoisted, positioned, and bolted to the top portion of the erected tower-1B. The total height of Tower-1 is 29 meters (as shown in the sketch), which is the sum of the individual towers 1A, 1B, and 1C. Similarly, the height of the remaining towers is 29 meters.

Tower-2

All of the processes outlined in tower-1 (above) will be repeated for tower-2 erection, however the ID will be replaced as shown below.

WORK METHODOLOGY

1A will be replaced with 2A; 1B will be replaced with 2B; and 1C will be replaced with 2C; the weight of the individual assembled portions remains constant. This refers to the weight of the various assembled portions (1A, 2A, 3A). The weight of 11A remains constant (12.68 ton), as do the weights of individual assembled components 1B, 2B, and 3B. Up to 11B is constant (5.66 tons), Similarly, the weight of the separate assembled pieces of 1B, 2B, and 3B. The weight of the individual completed parts of 1C, 2C, 3C, and 11C remains constant (1.77 ton) due to the availability of 11 towers at this site. The following 9 towers will be erected in the same manner as described above.

Gantry Beam Structure Erection

Once two adjacent towers have been erected, the assembled gantry beam structure will be lifted and erected in between them, as shown in sketch-1 as D (the assembled section of the individual beam structure weighs 11.14 tons) and bolted to the fish plates that have already been installed on the individual towers. Similarly, all of the other gantry beam constructions will be raised and built. There are 11 towers, hence there are a total of 10 gantry beam constructions. The height between the bottom of the built beam structure and the FFL is 22.5 meters, as indicated in the sketch. The lifting and erection of all towers and gantry beam structures will be done out using a 100T crane. The details of the cranes that will be hired are included separately. The remaining aspects regarding the erection of gantry towers and gantry beam structures will be carried out in accordance with the Method Statement for Tower and Gantry Installation.

WORK METHODOLOGY

II.9 BOLT TIGHTENING:

II.9.1 The bolts and nuts must be tightened once the tower has been entirely completed. Normally, bolts at the same level are tightened simultaneously.

II.9.2 The bolt threads must protrude from the nut by at least three threads. Bolts are tightened with the appropriate size of spanners.

II.9.3 Flat washers are used to fill gaps between tower members as needed and per the authorized structural drawing.

If any missing members need to be replaced, use the proper bolts and nuts sizes.

The Torque Values are follows Sl. No	Grade	Size	Torque in Nm
1	5.6	M16	100
2	5.6	M20	195

WORK METHODOLOGY

II.10 FINAL CHECKING AND INSPECTION:

After the tower is built, it is verified by the tower checking gang and made available for examination by the Engineers. Following erection and prior to stringing, the tower will be checked as follows:

II.10.1 The tower is completely tight.

II.10.2 Checking the Verticality of Erected Towers: The completed tower must be truly vertical after erection, with no straining. The vertical tolerance limit shall be 1 in 360 of the tower height.

II.10.3 All quality control documentation will be used to monitor the tower erection process. If any missing members need to be replaced, use the proper bolts and nuts sizes.

III. STRINGING PROCEDURE

III.1 STRINGING OF CONDUCTOR & BUS BARS:

III.1.1 The conductor drum shall be shifted near the gantry.

III.1.2 Conductor drums should be mounted on the conductor drum jack with spindle.

III.1.3 Follow the rotational orientation when putting the conductor drum.

III.1.4 Based on the measured span length, the conductor must be cut and left on the ground.

III.1.5 A suitable substance must be put beneath the conductor to prevent scratches while it is placed on the ground.

WORK METHODOLOGY

III.1.6 The conductor must be handled with care to avoid scratches and damage to its strands.
III.1.7 Insulators must be cleaned and inspected for cracks, chipping, and other defects.
III.1.8 The insulators will be assembled on the ground to produce the suspension and tension strings.
III.1.9 The suspension and tension hardware shall be assembled according to their individual drawings, and the insulator string shall be installed in the appropriate area of the hardware assembly.
III.1.10 For stringing bus bars, the conductor must be fixed and tightened in the clamp of the tension hardware on one side of the bus.
III.1.11 The full hardware assembly, including the conductor, will then be hoisted and fastened to the beam at the end. Sagging arrangements will be made on the other end of the bus, and the conductor will be tensioned.
III.1.12 The length of the conductor necessary for the bus will then be measured, and the conductor will be freed to return to the ground.
III.1.13 The conductor must be cut to the stated length after deducting the length of the tension hardware with insulators, and then secured to the tension hardware clamps.
III.1.14 The conductor, together with the tension hardware set, will then be dragged up and linked to the beam.
III.1.15 Mark the conductor, then lift it together with the hardware fitting. Fix the conductor and hardware to the tower beam.

WORK METHODOLOGY

III.2 JUMPERING OF CONDUCTORS:

III.2.1 The jumpers connecting different portions of the bus bars, as well as those connecting equipment to the bus bars, must be examined as required.

III.2.2 According to site requirements, conductors are linked using clamps and connectors before or after lifting for connection. To jumper separate portions of bus bars on the beam, the suspension hardware set, along with disc insulators, must first be lifted and attached.

III.2.3 A conductor of approximately the needed length for the jumper should be cut and straightened. This will be connected to the bus bar conductor on one side of the beam, taking into account the conductor's natural curve.

III.2.4 This will then be routed through the clamps on the suspension components to obtain the required curve. The other end of the conductor will then be taken up to the bus bar conductor on the opposite side and measured for length. The conductor must be cut to the proper length and then linked to the bus bar conductor on the opposite side. The length of the conductor and its natural curvature should be selected such that the jumper has a tidy and correct curve with no kinks or bends. The clamp of the suspension hardware will then be tightened.

III.3 JUMPERING FROM BUS BAR TO EQUIPMENT:

III.3.1 The approximate length of the conductor required for the jumper must be cut and connected to the bus bar conductor.

WORK METHODOLOGY

III.3.2 If the jumper is to be connected to equipment near or below a beam, the suspension hardware and disc insulators are first installed on the beam. The conductor must pass through the clamp of the suspension hardware.

III.3.3 The conductor's end shall be connected to the equipment's terminal connector. Measure the length of the conductor up to the apparatus.

III.3.4 After cutting the conductor to the desired length, it must be attached to the apparatus.

III.3.5 The suspension hardware clamps will then be tightened.

III.4 JUMPERING BETWEEN EQUIPMENTS:

III.4.1 If necessary, the distance between the terminal connectors of one piece of equipment and another is measured first, or the entire length might be used.

III.4.2 The conductor should be cut to the required length and then straightened to remove any bends or kinks.

III.4.3 The jumper conductor shall then be attached to the terminal connections of both the equipment and straightened or shaped as per site conditions to create a neat and suitable appearance.

III.5 STRINGING OF SHIELD / EARTH WIRE/OPGW:

III.5.1 The shield/earth wire/OPGW must be handled with care to avoid scratches or damage to the wire's strands.

WORK METHODOLOGY

III.5.2 The earth wire must be strung from the summit of the incoming tower, as shown in the drawing. Drop the shield wire down the tower structure to the junction box/test link/splicing box located at the tower's base.

III.5.3 Dress the wire properly by using a cleat clamp.

III.6 FINISHING WORKS:

III.6.1 All nuts must be properly tightened using the appropriate size spanners. Before tightening, make sure.

III.6.2 If a nut slips or runs over the bolt threads while being tightened, both the bolt and the nut must be replaced.

III.6.3 Check the tightness and torque of all fastened joints as required.

Safety Program

A. ORGANIZATION

A.1 Duties, Responsibilities, and Authority of the Safety Supervisor:

A.1.1 Assist the safety officer in eliminating and controlling unsafe behavior and conditions.

A.1.2 Periodically inspect and maintain safety tools, protection tools, fire extinguishers, and so on.

A.1.3 Conduct accident investigations and reporting, recommend necessary action to eliminate or control the use of gasoline and related flammable products, and conduct follow-up inspections to ensure compliance.

A.1.4 Be responsible and prevent fire hazards.

A.1.5 Supervise and control the operations of the safety engineer.

A.1.6 Plan and execute safety surveys and inspections, paying special attention to accident hazards and all new operations as the project progresses.

A.1.7 Instruct and educate any employees who become Safety representatives on various construction operations, and encourage them to report any injuries, no matter how minor they are.

A.1.8 Assume responsibility for establishing and maintaining safety facility signage.

A.1.9 Be accountable for establishing and maintaining discipline in all work areas.

Safety Program

B. EDUCATION & ORIENTATION

B.1 Subcontractors working on the site will get the same safety policies, procedures, orientation, and instructions.
B.2 The Safety Engineer and/or Foreman will provide instructions and recommendations as needed to accommodate the changing nature of the work and personnel.
B.3 Any work area that is considered hazardous will be labeled. Barricades will be erected, along with suitable warning signs.
B.4 If it is deemed essential, sessions will be arranged on site to re-educate employed individuals to the safety requirements.

C. SAFE WORK PRACTICES & PROCEDURES

C.1 The safe practices discussed in this chapter are designed to protect employees.
All personnel must read and follow them. Accidents occur without warning, and many are caused by a lack of understanding, inattention, or carelessness.
Lack of understanding of these safe procedures will not excuse noncompliance.

C.2 General:

C.2.1 Use safety equipment when it is necessary.

Safety Program

C.2.2 Learn how to do your job. Examine your work environments to see what difficulties and hazards may occur. Your actions may endanger coworkers or adjacent equipment and materials. Take the appropriate precautions to protect them. Review the safety standards for each given job with your supervisor; you will not be asked to perform a job that could cause danger to yourself or others.
C.2.3 Make sure you understand the emergency instructions. Prepare what you will do in the event of an emergency.
C.2.4 Report any unsafe equipment, hazardous situations, or harmful acts to your supervisor.
C.2.5 Do not use compressed air or oxygen to remove dust or grime from garments.
C.2.6 Carbon Tetra Chloride must not be utilized for any job-related purpose.
C.2.7 Failure to follow safety procedures for yourself or your coworkers.
C.2.8 Maintain proper housekeeping in your workspace. Do not leave materials that are hazardous to others.
C.2.9 To ensure your safety, respect all warning signs such as "KEEP OUT", "NO SMOKING", and "AUTHORIZED PERSONNEL ONLY".
C.2.10 Adequate sanitary facilities are provided on the job site; do not use any other areas.

C.3 Housekeeping:

C.3.1 Do not leave tools or materials in places that could endanger others. Place them in the box or return them to the tool store.

Safety Program

C.3.2 Scrap debris and garbage can cause fires. If you have an overabundance of these materials in your work area, ask your supervisor to have them removed.
C.3.3 You must utilize the garbage containers located on the job site. If you require one in your immediate work area, contact your managers.
C.3.4 When you finish your job, return all surplus materials to the stockpile.
C.3.5 Good housekeeping is a critical component of the safety program. It is the responsibility of all employees, including supervisors and craftsmen. To maintain good housekeeping.
C.3.6 Keep rooms neat. Do not leave dirty clothes. Food leftovers and soft drinks bottles gather. If drinking cups are used, place them in the designated containers. Put wrappers, paper bags, and other waste in these bins.
C.3.7 Toilet and drinking fountains are available for your convenience and comfort. Please assist to maintain them clean and sanitary.

C.4 Personal Protective Equipment:

Personal protection equipment is provided for you to use. You must use equipment specified for specific job assignments or places.

C.4.1 Respiratory protective equipment is essential in areas where dust, fumes, mists, or vapors have accumulated and provide a health risk.
C.4.2 Hearing protection equipment must be utilized as advised by the Safety Engineer or Foreman.

Safety Program

C.4.3 You must dress appropriately for the work you are doing.
C.4.4 When exposed to flying projectiles, dust, or chemicals, it is critical to wear appropriate eye protection.
C.4.5 All employees, visitors, and vendors are required to wear a hard hat in authorized areas.
C.4.6 Situations requiring specialized safety equipment or training must be discussed with the Safety Department.
C.4.7 Rubber boots must be used when working with concrete, dirt, or water.

C.4.8 Electricians who wear insulated gloves must inspect them for flaws.
C.4.9 Gloves must be worn while handling things or substances that may cut, tear, or burn the hands.
C.4.10 When other safety measures, such as nets, planking, or scaffolding, are ineffective, safety belts and lifelines must be utilized. Check that the safety lines are not connected to any other rigging. The lanyard must be attached at or above the level of the belt.

C.5 First Aid:

C.5.1 Any employee who has a physical disability, such as diabetes, poor eyesight or hearing, back or hernia, or fear of heights, should inform their managers that they would not
C.5.2 Drugs, tranquilizers, and insulin may not be used on the job unless permitted in writing by your personal physician, and your supervisor must be told in all cases.

Safety Program

C.5.3 All injuries, no matter how small, should be reported to your supervisor promptly. Treatment will be administered, and the occurrence will be documented. If you require medical attention later, your injuries will be documented in First Aid.
C.5.4 You must tell your supervisor before leaving the jobsite due to a work-related injury or sickness.
C.5.5 Never transfer an injured or critically ill person unless absolutely required to avoid further injury. Emergency First Aid instructions are posted across the jobsite. Familiarize yourself with them.
C.5.6 First aid teams are organized and trained to provide assistance. In the event of an injury or illness, you will receive appropriate first aid treatment.
Non-designated staff should not perform first aid unless there is significant bleeding or a loss of respiration.

C.6 Electrical:

C.6.1 Splices in electrical cables must keep the original cable's mechanical and electrical strength while being joined safely.
C.6.2 Temporary electrical cords should be covered or elevated whenever possible. They must be kept away from sidewalks and other areas where they could cause damage or tripping hazards.
C.6.3 Electricians are the only employees that can fix electrical equipment. Tampering with or unauthorized repair of electrical tools or equipment is not permitted.

Safety Program

C.6.4 All electrical tools and equipment should be grounded or double-insulated.
C.6.5 Damaged or damaged electrical tools must be marked as out of service and returned immediately.
C.6.6 Hazardous sites must be blocked and/or have adequate warning signs displayed.
C.6.7 Employees are not permitted to work on or near electrified circuits of any voltage unless proper safety precautions are followed and the work activity has been evaluated and approved by the Safety supervisor.
C.6.8 Temporary lights must have shields over the bulbs. Broken or burned-out lamps must be replaced immediately.
C.6.9 Energized wiring in junction boxes, circuit breaker panels, and other areas must be kept covered at all times.

C.7 Hand and Portable Power Tools:

C.7.1 Power tools should be hoisted or lowered using handles or buckets, never a cord or hose.
C.7.2 Inspect your tools every day to ensure they are in good operating order. Tools that have been damaged or are defective must be returned immediately for repairs.
C.7.3 Power saws, grinders, and other power tools must have suitable protection installed at all times. Removing or rendering guards inoperative may result in discharge.

Safety Program

C.7.4 A craftsman is judged based on the condition of his tools and how he uses them. The tool room will only issue tools that are in safe functioning condition. You must follow all of the manufacturer's directions. In addition, adhere to the following safe procedures.

C.7.5 To keep personnel from tripping and falling, cords and hoses should be kept off of walkways, stairs, and ladders. They must be secured at least 2.2 meters above walkways, runways, and ramps, wherever practicable, to avoid tripping hazards or damage from equipment or materials.

C.7.6 When utilizing the tools indicated below and working in close proximity to individuals who use similar items, you must wear the necessary supplementary personal protective equipment. If you have any issues concerning tile protection equipment or safety requirements, contact your supervisor.

- Jackhammer, Tameers
  - ❖ Eye protection, Hearing Protection and Foot Protection.
- *Chipping Hammers*, Impact Wrenches, Reamers
  - ❖ Eye Protection, Hearing Protection
- Cutting Torches, *Are Welders*
  - ❖ Eye Protection, Hearing Protection

Safety Program

- Power Actuated, Tools, Grinders, Hand – Held Chipping Hammers
  - Eye protection.
- Eye Protection
  - Safety glasses or mono goggles.
  - Burning goggles/welding hood.

C7.7 All fuel-powered tools must be turned off while being refueled. Smoking is not allowed during refueling procedures.
C7.8 All pneumatic tools must have safety clips or retainers added to prevent them from being accidentally expelled from the barrel.
C7.9 For hand-held pneumatic tools, each supply line's manifold output must have an approved safety check valve fitted.
C7.10 All pneumatic hose connections must be properly attached.
C7.11 All portable electric tools must be grounded (with the exception of Underwriters Laboratory-approved, double-insulated instruments).
C7.12 Only personnel with appropriate credentials are allowed to use power-actuated tools. When using power-actuated tools, follow all directions provided by the manufacturer.

Safety Program

C.8 Material Handling Storage and Disposal:

C.8.1 Materials held inside buildings or structures under construction shall not be within 1.8m of any hoistway or other inside floor entrance, nor within 2.0m of any outer wall that does not extend above the material stored.

C.8.2 When handling items, use the right lifting procedures.

C.8.3 Stored goods shall not obstruct any building exits.

C.8.4 All materials must be correctly placed and fastened to avoid slipping, falling, or collapsing. Aisles, stairs, and passages must be kept clear to ensure the safe movement of people and equipment, as well as emergency access.

C.8.5 Protruding nails must be twisted or withdrawn while removing Forms or uncrating materials.

C.8.6 Materials should not be stored in a way that prevents access to fire escapes or emergency equipment.

C.8.7 Materials kept on scaffolds, platforms, or walkways must not exceed the amount required for a single day of operation or the scaffold or platform's rated capacity.

C.8.8 Materials should never be thrown or dropped from a distance more than 6 meters. The drop zone must be barricaded to keep personnel from being harmed by falling objects.

C.8.9 Pipe, conduit, and bar stock should be placed on racks or piled and blocked to prevent movement.

Safety Program

C.9 Cranes and Hoists. Motor Vehicles and Heavy Equipment:

C.9.1 Routine maintenance, fueling, and repairs should not be done while the equipment is in use or powered on.

C.9.2 Operators should only accept signals from one man; but, in an emergency, anyone can issue a stop signal.

C.9.3 Only regular hand signals will be recognized.

C.9.4 All cranes, hoists, motor vehicles, and heavy equipment must be operated and maintained in accordance with the specified requirements.

C.9.5 All cranes, hoists, motor vehicles, and heavy equipment must be inspected before operation. Before using the equipment, all deficiencies must be corrected.

C.9.6 Before putting a hoist into service, all functions and safety features must be thoroughly tested under the supervision of experienced professionals.

C.9.7 The construction and operation of material hoists must adhere to set criteria.

C.9.8 A designated employee must monitor equipment clearance and provide timely warning for any activities in which the operator's vision is blocked.

C.9.9 The parking brake must be applied whenever the car is parked.

C.9.10 Personnel hoists must be erected and operated according to specified norms.

C.9.11 Accessible locations inside the swing radius of all cranes should be barred to protect employees from being crushed by the counterweight.

Safety Program

C.9.12 When handling, charging, or utilizing batteries. Use jumper cables and wear safety eyewear.
C.9.13 Rated load capacity charts, optimum operating speeds, specific hazard warnings, and other critical information must be prominently displayed in all cranes, hoists, and other equipment.
C.9.14 A notice that reads "NO RIDERS ALLOWED" must be displayed on the car frames and at each landing. Employees are not permitted to ride material hoists except for the authorized purpose of inspection and maintenance.

C.10 Ladder:

C.10.1 Ladders should not be positioned against mobile items or project into passageways without proper protection.
C.10.2 All straight ladders must be tied off at the top or otherwise secured to keep them from moving.
C.10.3 Metal ladders should not be utilized for electrical work or in situations where they may come into touch with energized wiring.
C.10.4 Job-made ladders must meet OSHA/MSHA regulations.
C.10.5 Broken or broken ladders should not be utilized. Repair or eliminate them instantly. Ladders to be repaired must be labeled "DO NOT USE" and removed from the work area.
C.10.6 Do not join short ladders to form a longer ladder.
C.10.7 Ladders used to access a floor or platform must be at least 0.9 meters above the landing area.
C.10.8 The base of the ladder must be put back a safe distance from the vertical, about one-fourth of the ladder's operating length.

Safety Program

C.11 Scaffolding:

C.11.1 Scaffold boards must be at least 50 mm x 300 mm full thickness lumber of structural grade or similar. They must be split or secured and extend at least 150 mm beyond the end supports, but no more than 300 mm.

C.11.2 Temporary scaffolding does not exist. All scaffolds must be erected and maintained according to approved standards.

C.11.3 When scaffolding is in operation, all open sides must have guardrails, midrails, and toe boards attached. They should be built using components provided by the manufacturer or using 50 mm x 100 mm lumber.

C.11.4 Each scaffold must be inspected and approved by the tile foreman before its first usage, as well as after any changes or moves.

C.11.5 All scaffolds must be completely planked; no employee may work from a single plank.

C.11.6 Do not overburden scaffolds. Material should be brought up as necessary. When the work is completed, remove any surplus material and scrap from the scaffold.

C.11.7 Barrels, boxes, kegs, and other unstable objects should never be utilized as work platforms or to support scaffolding.

C.11.8 Unauthorized personnel are not permitted to change scaffolds or work platforms.

C.11.9 Scaffolds must be linked to the building or structure.

C.11.10 Scaffold planks must be visually inspected before to use.

Safety Program

C.11.11 Each scaffold must have its own access ladders. Climbing off the end frames is banned unless the design includes an approved ladder.

C.12 Cutting and Welding Operations:

C.12.1 Never weld or burn oil barrels, tanks, pipelines, or other systems that may have held combustible or unknown products without first receiving consent from the Safety Representative or other appropriate authority.

C.12.2 Cutting and welding procedures carry a high risk of crew injury and fire. When executing either, always take these measures.

C.12.3 Before beginning to cut or weld, inspect your work area to ensure that sparks or molten metal do not fall onto combustible items. If you are unable to provide the essential safeguards, consult with your supervisor.

C.12.4 When burning or welding, use authorized eye protection goggles, face shields, or welding helmets. Always utilize suggested protection when performing tile-specific working activities.

C.12.5 Welding, burning, and heating in tight spaces may necessitate general mechanical or local exhaust ventilation to lower smoke and fume concentrations to safe levels. Before beginning these operations, contact with a safety representative.

C.12.6 If enough ventilation is not available, employees must be provided with and compelled to use air-supplied breathing apparatus.

Safety Program

C.12.7 Protective caps must be kept on all cylinders that are not in use.
C.12.8 All cylinders must be carefully secured to avoid tripping.
C.12.9 Oxygen and acetylene (or other fuel gas) cylinders must be stored separately.
C.12.10 When welding, cutting, or heating dangerous metals such as zinc, lead, cadmium, or chromium containing metals in the open air, use filter-type respirators.

C.13 Excavation and Trenches:

C.13.1 All excavation materials must be located at least 0.5 meter from the edge of the falling excavation. Precautions must be taken to avoid such things falling into the excavation.
C.13.2 Every excavation should be appropriately blocked.
C.13.3 All excavations require safe access via ladders, stairs, or ramps.
C.13.4 All excavations should be backfilled and carefully consolidated, with the surface left in good condition as quickly as possible.
C.13.5 Trenches 1.5m or deeper must be shored or sloped back to their angle of repose. Any excavation in unstable soil may necessitate shoring or slope.
containing metals in the open air, use filter-type respirators.

C.14 Project Site Traffic Regulations:

C.14.1 All persons operating vehicles on the project site must follow the project's traffic laws. A vehicle is any form of vehicle or construction equipment capable of moving on project roadways.

Safety Program

C.14.2 Drivers should drive slowly through all busy regions. Give pedestrian traffic due regard.
C.14.3 Do not cut back to your side of the road after overtaking another vehicle unless you are certain it is safe to do so.
C.14.4 Do not run your vehicle alongside another vehicle traveling in the same direction.
C.14.5 Drivers should not exceed the speed limit.
C.14.6 Do not follow the vehicle ahead of you too closely. (Do not tailgate).
C.14.7 Drivers are not permitted to drive around barricades in the roadway or on barricaded roadside areas.
C.14.8 Any emergency vehicle responding to an emergency call must have priority over all other vehicles.
C.14.9 Do not cut corners; instead, stay on the right side of the road until you make your turn and enter the road into which you are turning in the right lane.
C.14.10 When approaching slow-moving vehicles, animals, an accident, or anything unexpected, slow down.
C.14.11 Do not drive on the shoulder of the road.
C.14.12 Do not transport more than three (3) people in the front seat of any vehicle. This includes the driver.
C.14.13 Drivers shall not allow passengers to exit any vehicle unless it has come to a complete stop. Before you open the vehicle door, look in both directions.

Safety Program

C.14.14 Drivers may not pass any cars in a "NO PASSING" zone. A no-passing zone is marked by a sign and a solid line on one or both sides of the broken centerline. If the solid line is on the driver's side of the broken centerline, do not pass.
C.14.15 Drivers must use the vehicle horn sparingly to indicate that they intend to pass another vehicle.
C.14.16 While the vehicle is in motion, all passengers must keep their arms and legs inside the windows of pickups and trucks. No employee shall stand in the rear of vehicles or pick-ups while in motion.
C.14.17 Passengers are not permitted to ride on top of material loads.
C.14.18 Drivers should limit their speed in extreme dust conditions. During a dust storm, the driver may need to pull off the road and park until vision improves.
C.14.19 Signal lights are only to be used as turn signals. The signal light must be triggered around 200 meters before making the turn. Make sure the signal light is turned off after the turn is completed.
C.14.20 Drivers are not permitted to park in any fire zone, restricted zone, or other no-parking areas, such as driveways and doorways.
C.14.21 Park in authorized areas, as indicated or directed.
C.14.22 Vehicles may not be loaded over the load limit specified for that type of vehicle.
C.14.23 All cars must have two (2) headlights, functional taillights, turn signal lights, and stop lights that are always adjusted.

Safety Program

C.14.24 Drivers must not leave automobiles unattended with any doors open.
C.14.25 Before backing out of a parking space, drivers must inspect the rear of their car to verify that no objects are in the vehicle's path.
C.14.26 When carrying material or equipment, all loads must be secured using binders to prevent movement of the cargo.
C.14.27 Any spillage from hauling vehicles, such as sand, rock, or other debris, must be cleared immediately from the roadway.
Note: Each driver is responsible for inspecting their car to ensure that all lights work properly.
C.14.28 The vehicle's wheels and brakes must be in good condition at all times.
C.14.29 Drivers must always keep their windshields, headlights, taillights, and rearview mirrors clean.

C.15 Safe Passage:

C.15.1 All cars and people must be able to move freely through designated safe pathways.
C.15.2 Safe routes should be signposted to distinguish them from work areas.
C.15.3 Materials and hazards should be kept out of safe routes.

Safety Program

D. VIOLATION CONTROL & PUNISHMENT

D.1 To ensure safety, disciplinary measures must be taken on violators of safety regulations, rules, and/or requirements, for example.

D.1.1 Any person whose carelessness, inattention, or lack of knowledge has caused hurt or property damage.

D.1.2 Any individual who has violated a safety or security requirement, resulting in property damage or a disruption to normal working activities.

D.1.3 Anyone who fails to report an accident or attempts to cover one up.

D.1.4 Anyone who misleads or cooperates in the conduct outlined in Article D, Clauses D.1.1, E.1.2, and D.1.3.

D.1.5 The Site Supervisor will initially decide the severity of the punishment. Complaints will be directed to the Branch Office.

E. ACCIDENT REPORTING PROCEDURE

E.1 All accidents that occur on the project site or while rerouted to and from the project site must be reported promptly.

Safety Program

E.2 First, care for the injured.
In the event of an injury requiring ambulance or medical assistance at the scene of the accident. Call the Hospital from any phone on the project or nearby.
E.3 Second, report an accident.
E.3.1 During or after regular work hours.
Report immediately to the Safety Supervisor, who will notify the Authorized Representative in the Branch Office.
E.4 Contacting the GOSI.
All on-site accidents must be reported to GOSI. The site safety Engineer or Supervisor must report all accidents to the Branch Office for follow-up.

F.SAFETY/INSPECTION FORMS

A3LO3 SERVICES

Supply Chain Management

including design and engineering functions for Power Generation, Transmission and Distribution

Installation Services

for Electrical Power Systems up to 400Kv

Testing & commissioning and Troubleshooting Services

for Electrical Power Systems up to 400Kv

Termination and Jointing Services

of EHV/HV Cables' Accessories up to 220Kv

Operations and Maintenance (O&M) Services

including projects constructed by Third-Parties

A3LO3 SERVICES

Energy

End-to-end EPC Solutions for Power Grid infrastructure including:

- Balance of Plant (BoP)
- Power Transmission and Distribution (T&D)
- Overhead and underground sub-transmission power lines and its associated distribution substations up to 69Kv
- Underground transmission power lines and its associated grid substations up to 400Kv

A3LO3 SERVICES

Electromechanical Installation Work is the area of expertise for a3lo3 Services. To meet the demands of our clients in the power generation, transmission, and distribution sectors, a3lo3 Supporting Services provides a comprehensive menu of project management, planning, engineering, procurement, construction, commissioning, and maintenance skills. Our clients can now choose between a single service or full EPC services thanks to this.

WE PROVIDE

Electrical Engineering Services

Hands-On Technical Training

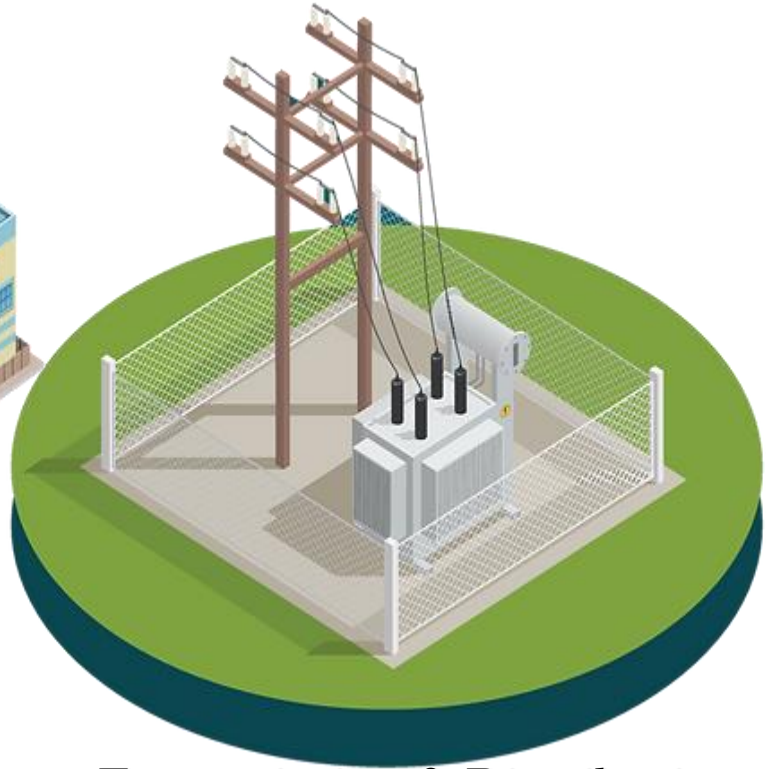
Technical Field Services

A3LO3 SERVICES

WE SPECIALIZE AT ALL LEVELS OF POWER SYSTEMS ACROSS ALL INDUSTRIES

Power Generation

Industrial & Commercial



Transmission & Distribution

A3LO3 SERVICES

A3lo3 provides highly qualified automation and protection engineers. The skilled group of engineers is equipped to handle the following activities:

Advanced Numerical Relay testing and commissioning We at a3lo3 accelerate your learning. Everyone has preferred learning (Differential, Distance, O/C,etc), Bus Bar testing and commissioning, Stability test, Primary Injection, Transformer tests (tanA, turns ratio, etc), LV distribution panels testing, ABTS & ACCS Configuration testing, BCU configuration and integration, CID file preparation for Protection IEDs & Testing and commissioning of SAS systems.

A3LO3 SERVICES

To handle all industrial electrical and instrumentation tasks, A3lo3 has a dedicated Electrical & Instrumentation team. Installation of panels and transformers, cable trays and conduits, cable pulling and termination, lighting, fire alarm systems, grounding, and lightning protection systems are all included in our scope of service. Instrumentation Scope: DCS Panel, Cable Conduit, and Instrument Junction Installation comprises instrument tubes, trays, boxes, and stanchions.

The supply, installation, testing, and commissioning of HVAC equipment and DDC panels are all included in the A3lo3 scope. Supply, Setup, and Accessories for HVAC Ducts

A3LO3 SERVICES

A3lo3 provides highly qualified engineers and technicians. The skilled group of engineers is equipped to handle the following activities:

- Supply and installation of generators.
- Supply and installation of low and medium voltage cables.
- Supply and installation of all kinds of switchgear and electrical panels.
- Supply and installation of transformers.

Our team has carried out a number of NEOM projects as well as projects including the delivery and installation of energy in the Central Region. Collaboration with numerous governmental and non-governmental organizations, including the National Guard Ministry, SFDA, SWA, etc.

A3LO3 SERVICES

A combination of technical and subject matter expertise pertinent to the work we undertake with our clients makes up our testing team. The testers can carry out their duties with little overlap and no confusion because the team is well organized and has clearly defined roles and responsibilities. Over Twenty of our engineers are experts in testing apparatus like FREJA-300, OMICRON CMC-256 Plus, Omicron CT Analyzer, Omicron CPC-100, Isa, Sverker ,etc. and familiar with advanced numerical relays of SEL, SIEMENS, ALSTOM, ABB, GE, etc., We do perform testing and commissioning activities on control and protection panels, and we have also commissioned SAS systems in collaboration with SEL. Additionally, our engineers have a great deal of experience commissioning OHL to UGF circuit modifications throughout the Kingdom.

A3LO3 SERVICES

At a3lo3, we expedite your education. We include each person's preferred learning strategies into our instruction to ensure that you advance swiftly and naturally. Technical courses are taught at a3lo3 by the training staff in association with internal specialists and/or outside providers. Control & Protection System and Substation Automation System courses are available at the factory premises of equipment manufacturers as well as at the on-site facilities of customers. Our training programs will be centered around practical exercises. Our trainers will give the participants hands-on instruction, which will facilitate their effective learning.

Atlo3 has conducted more than 20 training programs on Protection relays & SAS solutions both inside and outside of Kingdom

SOLUTIONS

For From power production to commercial high-rises, our staff has engineering and field service experience in a variety of industries.

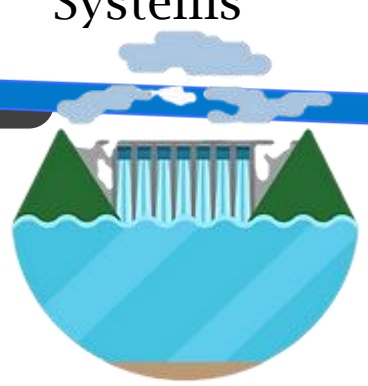
POWER GENERATION

Engineering

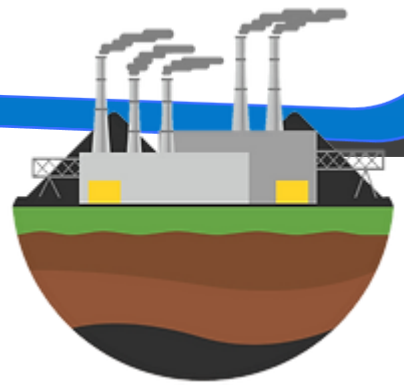
- Power system study of Power Plant Electrical Systems
- Detail design of Power Plant P&C and SCADA Systems
- Detail design of Generator Excitation Systems

Technical Field Services

- Commissioning of Power Plant Electrical Systems
- Maintenance of Power Plant Electrical Systems



Hydroelectric



Thermal

Solar

Wind

SOLUTIONS

UTILITIES

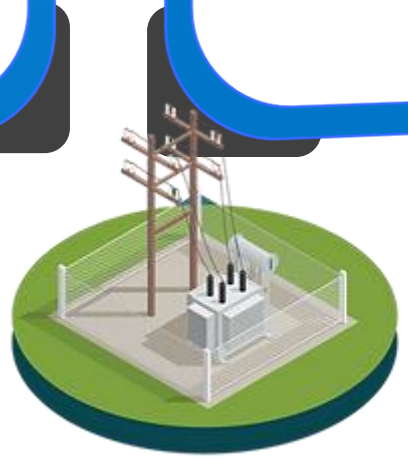
Engineering

- System Study of HV/MV substation electrical system
- Design and Development of P&C and SCADA Systems
- Specializing in Complex Brownfield Retrofits

Technical Field Services

- Commissioning of HV/MV electrical equipment
- Maintenance of HV/MV electrical equipment
- Construction Support & Planning

Transmission



Distribution

Substation

SOLUTIONS

Industrial

Engineering

- Power system study of Industrial electrical system
- Detail Design of P&C & SCADA Systems for industrial plants
- Specializing in Complex Brownfield Retrofits

Technical Field Services

- Commissioning of HV/MV electrical equipment
- Maintenance of HV/MV electrical equipment

Oil & Gas

Manufacturing

SOLUTIONS

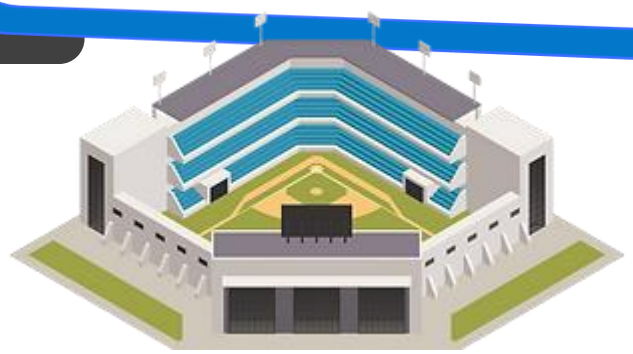
COMMERCIAL

Engineering

- Power system study of Industrial electrical system
- Detail Design of P&C & SCADA Systems for industrial plants
- Specializing in Complex Brownfield Retrofits

Technical Field Services

- Commissioning of HV/MV electrical equipment
- Maintenance of HV/MV electrical equipment



Recreational & Sports Arenas

High Rise Facilities

Retail Complex

SOLUTIONS

For safe and dependable power supply and distribution in residential, commercial, and industrial installations, A3lo3 offers a broad range of services and solutions in the fields of low voltage power distribution, MVAC, and HVAC. Our range of solutions comprises, but it's not limited to:

Testing

- Low, Medium and High Voltage Power.
- Systems. Large Motors with Variable Speed Drives
- Protective Relay
- Circuit Breaker Testing (up to 132kV)
- Transformer Testing

- Primary Current Injection Testing
- AC/DC Hi-Potential Testing
- Startup and Commissioning of New Equipment and Systems (Greenfield and Energized sites)
- Troubleshooting, Analysis and Evaluation of In- Service Equipment and Systems
- Commissioning /Test & Start-up Services

SOLUTIONS

Also,

- High Voltage Apparatus Testing
- Factory Witness Testing
- Site Acceptance Testing
- Monthly Inspection of Substations
- Drawing/Print Review
- Scheduling Review
- Switchgear Modifications, Upgrades and Repair

In addition to, we provide high voltage testing services for GIS switchgears (RCP) up to 132kV.

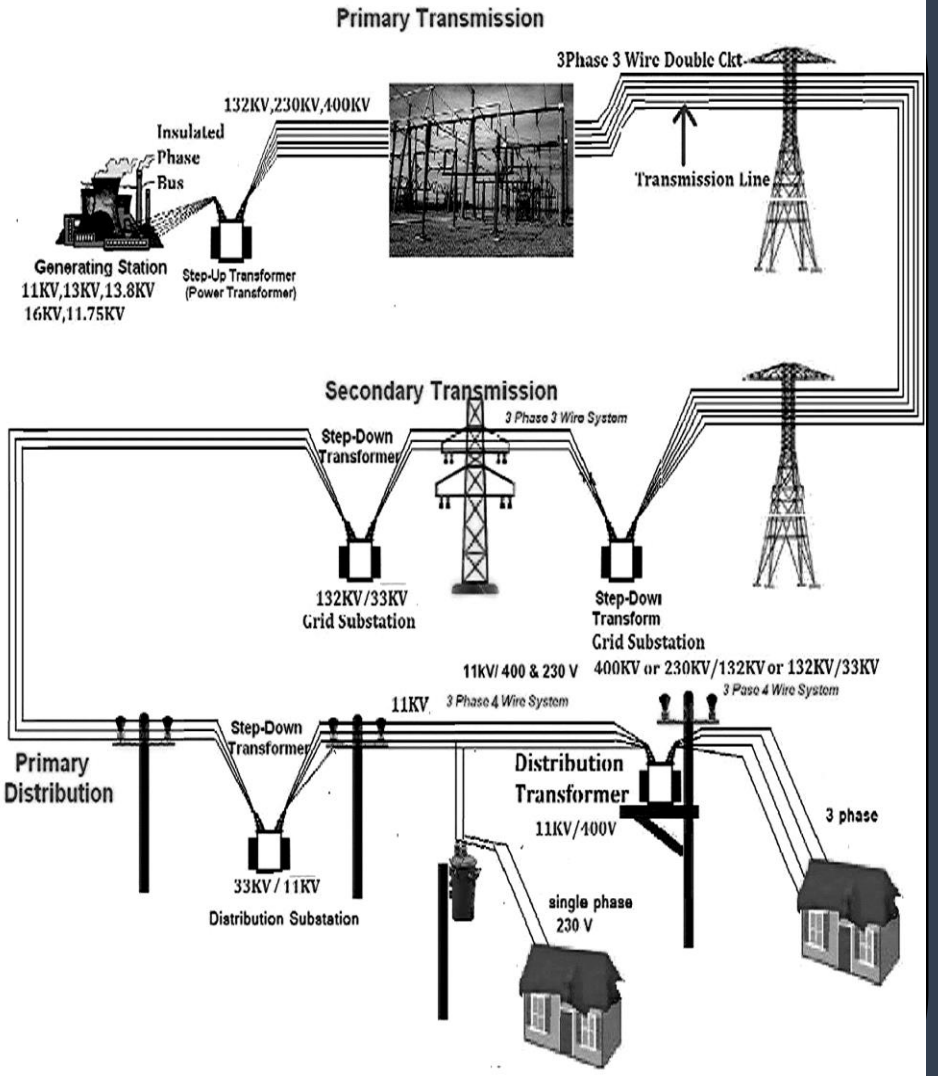
Benefits:

- A solution for all kinds of application
- Long service life, even under harsh operating conditions.

Our Projects

- Construction of 380kV D/C OHTL between PP9 BSP#9019 and Khashim Alan BSP#9017
- Construction of 380 KV OHTL Associated with NIC South 380/132/33KV BSP.
- Integration of Farah 380/132 KV to Abha North 132 KV S/S.
- Construction of Qassim 380 KV Overhead Transmission Line.
- construction of the 380kV overhead transmission line (OHTL) project between NIC Circle Substation and Duba Green Substation in NEOM.
- Construction of 380kV D/C OHTL between Tabuk and ISCC.
- construction of a 380kV Double Circuit Overhead Transmission Line (OHTL) between Jillah and Layla.
- Connection of Al-Aridah, Ayban and Ad-Dayir 132KV SS in Jazan with Networks
- Construction of 132/13.8 Kv Al-Morabaa Substation #8187 in Riyadh
- Electrical Generator Construction, Jubail

  Construction of Electrical Generator building including supply and installation of electrical power generator and Solar system for Tofeih well field - Jubail WTS



TRAINING

- Customers are receiving training from us in order to receive more customized training services, on-site training, and industrial training
- Program of instruction for users at all levels Practical instruction and hands-on practice make up 80% of the program
- Training covers energy metering, BCUs, SAS Solutions, protection and control relays, and more

APPROVALS

a3lo3 is approved by National Grid, Royal Commission, Aramco, and SWCC for testing and commissioning in Kingdom of Saud Arabia.

RESOURCES

SALES &MARKETING

assembling a group of engineers who can satisfy the diverse needs of the Saudi and Gulf markets and who have a track record of success in customer relations. The department is capable of providing sound advise on product choice and beyond, to both national and international corporate entities as well as start-up firms and private persons.

PROJECT MANAGEMENT

Our project team is made up of highly qualified and experienced engineers who will assume full responsibility for the project, comprehend its entire scope, and professionally manage it to fulfill our clients' deadlines.

TESTING & COMMISSIONING

Testing and commissioning team ensure your equipment and systems are safe and meet critical standards and specifications through the lifecycle of your project. Proper testing and commissioning of equipment and systems is critical to maintaining reliability for your customers

RESOURCES

QUALITY ASSURANCE

Our engineers and technicians undergo extensive in-house training .We follow well-documented testing and commissioning procedures and guidelines to ensure safe and thorough planning and testing, so you can manage risk and safeguard ongoing operations . Regardless of project size and complexity, our team is fully committed to exceeding your expectations for quality, schedule and cost. The experts assigned to your project work not just for you as a sub-contractor, but with you as an extension of your staff. This relationship ensures that when questions or discrepancies arise, they are addressed promptly and resolved with the expediency that you receive from your own employees. All commissioning tests are based on authorized written procedures. The preparation of test procedures, including their verification and approval, is carried out according to procedures defined in the Commissioning Manual.

A3lo3's Quality Assurance, Inspection, and Service Department makes sure that standards are upheld at all operational levels, guaranteeing client satisfaction.

OUR CUSTOMERS

شركة مجموعة كابلات الرياض
Riyadh Cables Group Company

اثلث للمقاولات

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